

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
7 October 2004 (07.10.2004)

PCT

(10) International Publication Number  
**WO 2004/086546 A2**

(51) International Patent Classification<sup>7</sup>: H01M 8/04, 8/24

(21) International Application Number:

PCT/JP2004/003146

(22) International Filing Date: 10 March 2004 (10.03.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

2003-080219 24 March 2003 (24.03.2003) JP

(71) Applicant (for all designated States except US): NISSAN MOTOR CO. LTD. [JP/JP]; 2, Takara-cho, Kanagawa-ku, Yokohama-shi, Kanagawa, 2210023 (JP).

(72) Inventor; and

(75) Inventor/Applicant (for US only): HIGASHI, Shugo [JP/JP]; 53-4-202, Kasumidai, Hodogaya-ku, Yokohama-shi, Kanagawa, 2400014 (JP).

(74) Agent: GOTO, Masaki; Shoyu-Kaikan, 3-1, Kasumigaseki 3-chome, Chiyoda-ku, Tokyo, 1000013 (JP).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

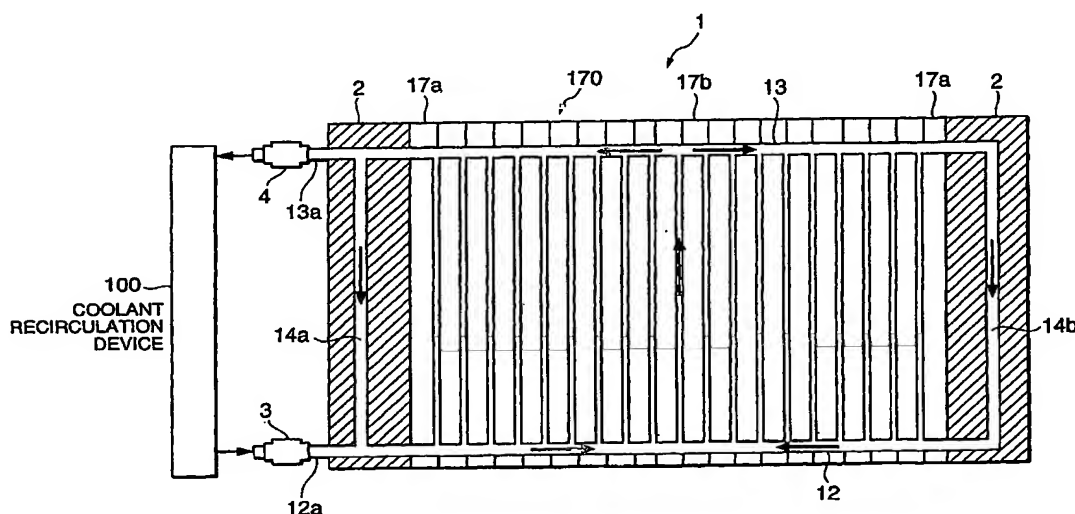
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: FUEL CELL SYSTEM



(57) Abstract: Coolant passages (11a, 11b) are provided in unit cells (17a, 17b) which form a laminate (170) of the unit cells (17a, 17b). A coolant supply manifold (12) which distributes coolant from a coolant recirculation device (100) to the coolant passages (11a, 11b), and a coolant discharge manifold (13) which recovers coolant from the coolant passage (11a, 11b) to the coolant recirculation device (100), pass through the laminate (170). The coolant supply manifold (12) and coolant discharge manifold (13) are connected by two bypass passages (14a, 14b). At low temperature, heat transfer from the high temperature parts to the low temperature parts is promoted by shutting off circulation of coolant between the coolant recirculation device (100) and the laminate (170) by a valve (3, 4), and recirculating coolant inside the fuel cell stack (1) via the bypass passages (14a, 14b).